

REMARKS

Claim 1 is amended to include the subject matter of claim 2, which is canceled without prejudice to reentry. Claim 3 is amended to become independent and to include subject matter based on paragraph [0030] in the specification. Claim 6 is like claim 4 but depends from now-independent claim 3. New claims 7 and 8 are based on paragraph [0026].

The claims were all rejected under §103 over Kanai, US 4,722,996. This rejection is respectfully traversed.

(1) The Examiner conditions the rejection on an asserted lack of “evidence of unusual or unexpected results relative to the presently claimed weight ratio” (Office Action, bottom of page 2). The Applicant believes that there *are* unexpected results, that is, results that could not have been predicted from the applied art.

The Applicants’ Fig. 3 show the result of experiments, described in paragraphs [0061] to [0067], on worm wheels incorporated into an electric power steering gear. Fig. 3 shows that the durability of a gear is significantly improved when the weight ratio is limited to the range above 0.1, and more particularly to the range above 0.9 (the lower limits of the claimed ranges).

In the experiments, worm wheels were incorporated into electric power steering apparatus and rotated in opposite directions under load. As Fig. 3 shows, the number of cycles at which the gear broke was 20,000 when the weight ratio of PA6 was zero, but increase to 25,000 when the weight ratio was 0.1.

The Examiner is invited to consider the effect of this improvement of 5,000 cycles in relation to claim 5, reciting a power steering apparatus. On a typical trip the power steering operates at full torque twice, e.g., when pulling into or out of a parking space. Thus, every day might represent one cycle in Fig. 3. Assuming one cycle per day, the 5000 cycles corresponds to 6.8 years of driving, and the 0.1 percent of PA6 increases the expected trouble-free lifetime by that much time. Thus, the reliability of the automobile is substantially increased.

Although it is not shown in Fig. 3, the *upper* limits of the Applicant's claims are as unexpected as the lower limits. The Examiner is referred to paragraph [0025] of the specification.

(2) New claims 7 and 8, depending respectively from claims 1 and 3, are patentable by the arguments above (and also below). According to Fig. 3, the improvement is greater here.

(3) The Examiner asserts that the reference's silence on weight ratios is a teaching that any weight ratio will provide a reasonable expectation of success (last paragraph on page 2 of the Office Action).

The Applicant respectfully disagrees that silence can be taken as a teaching, and presents a counter-example: A patent that describes an internal combustion engine, but does not mention the oil, cannot be taken to imply that *any* sort of oil is good for such engines. A person of ordinary skill in the art would not put safflower oil or whale oil into a crankcase just because a patent in the same field failed to mention oil. Similarly, the person of ordinary skill would not employ a specific weight ratio based on a *lack* of teaching.

(4) The Examiner asserts the teaching from silence only in support of reasonable expectation of success. However, the other two elements of an obviousness rejection are not asserted to be so supported, nor are they mentioned. With respect, the Applicant believes that the requirements of MPEP § 2143 are not met.

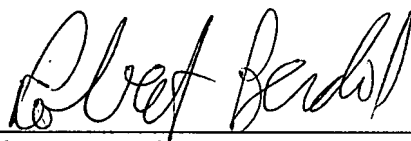
(5) Kanai is only concerned with corrosion resistance for under-hood applications of plastic (col. 1, line 29 to col. 2, line 19; also the title, abstract, independent claim 1, field of the invention at col. 1, line 14, and summary at col. 2, line 23). Kanai is not concerned with dimensional stability and mechanical strength, which are concerns of the Applicant (specification paragraphs [0008] to [0011]), and the Applicant is not concerned with under-hood corrosion, because its gear body is used inside a power steering apparatus (Figs. 1-2).

(6) With respect, even if Kanai disclosed a ratio, there would be no suggestion to modify that ratio to achieve dimensional stability and mechanical strength, and therefore experimentation (which is not suggested) could never reach the Applicant's claims. Any such experiments (if actually suggested) would be aimed at improving corrosion resistance rather than mechanical properties and dimensional stability.

(7) The subject matter of amended claim 3 is not disclosed or suggested by Kanai. Claim 6 depends from claim 3 and is likewise allowable.

The Applicant's specification states (paragraphs [0008] and [0010]) that PA6 is strong but has low dimensional stability, while PA66 has good stability but is weak. The Applicant has discovered that by using the claimed small proportion of PA6, a strong but stable gear can result (paragraph [0017]; Fig. 3 as discussed above). With respect, there is no suggestion whatsoever to change the proportion of Kanai, whatever it might be; and since Kanai discloses no ratio, what would result from the non-suggested change would be indeterminate. Withdrawal of the rejection is requested.

Respectfully submitted,



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